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THE MUSHROOM GROWERS'
ASSOCIATION

MGA
BULLETIN

DECEMBER, 1953 · NUMBER 48

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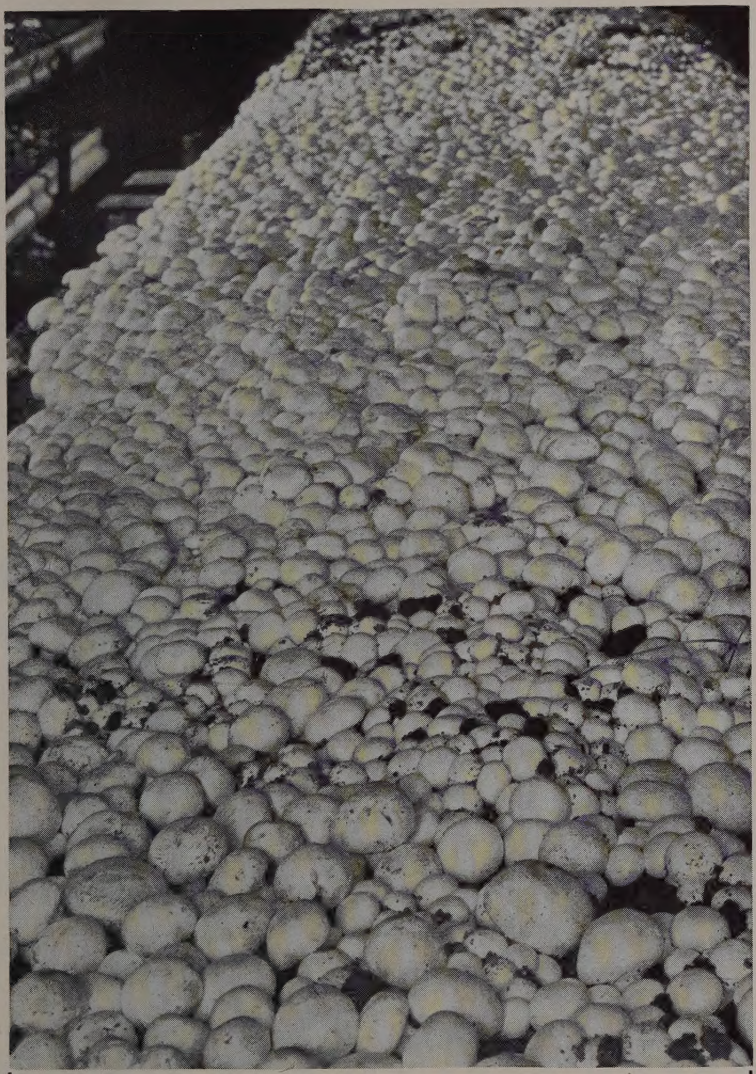

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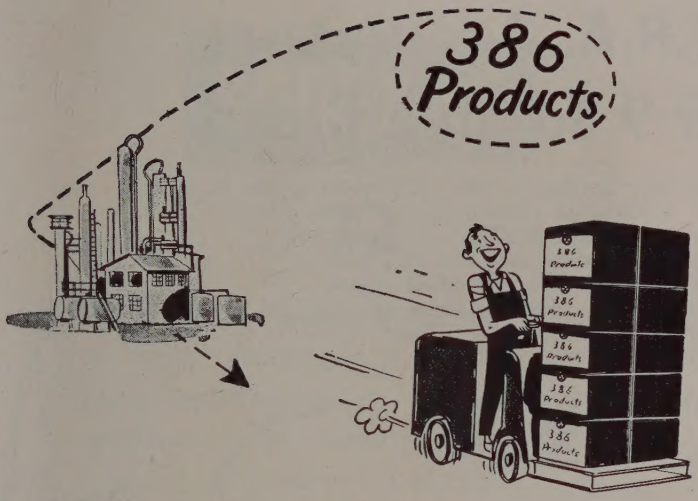

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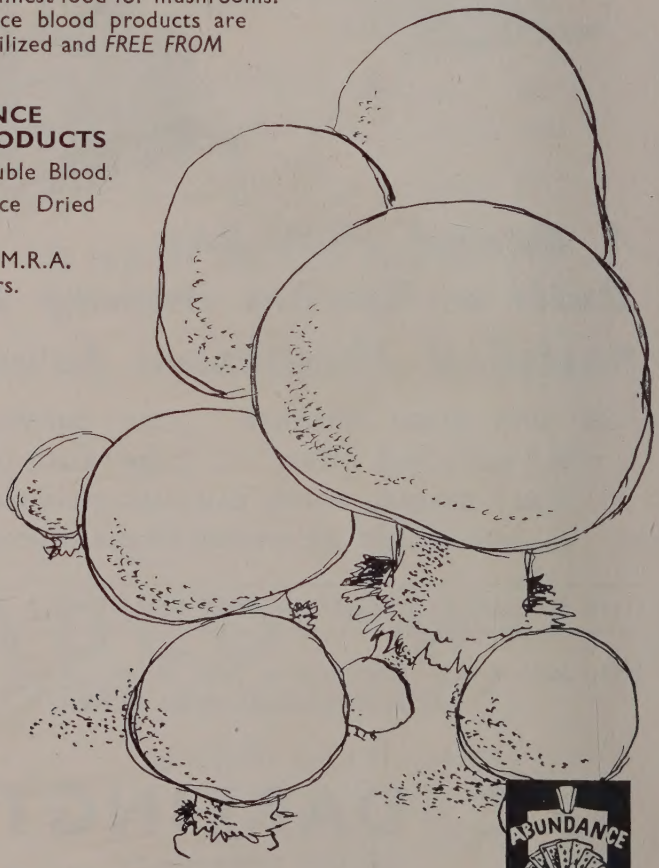

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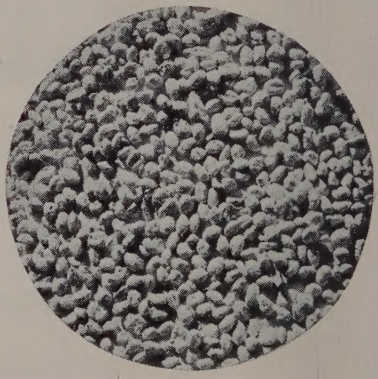

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The
MGA BULLETIN
DECEMBER 1953
NUMBER 48

EDITORIAL

TARIFFS

By the time this number of the Bulletin is published we may know whether a proper duty is again to be imposed on imported mushrooms.

In 1931 a duty of 8d. per lb. was placed on all fresh mushrooms entering Great Britain. It is said it " saved the Mushroom Industry."

In 1947 a Government White Paper on the Geneva tariff negotiations and GATT (the General Agreement on Tariffs and Trade) was published. It was announced that the import duty on " raw " mushrooms would be *ad valorem* 10% from 1st May to 30th September, and 20% from 1st October to 30th April. The MGA had asked for a fixed duty of 1/6d. in summer and 2/- for the remainder of the year. We thought that reasonable, for production costs had risen by more than 200% since the original 8d. duty was fixed.

The MGA protested to the NFU that an *ad valorem* duty merely lowered the duty as the price fell, i.e. when we most needed protection. The NFU agreed we had grounds for dissatisfaction. We reserved the right to make representations against *ad valorem* duties at a later date; we would prefer specific duties.

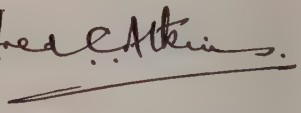
In 1950 the NFU was invited by the Ministry of Agriculture to submit recommendations to the Government in connection with the forthcoming discussions at Torquay. The MGA prepared the case against any reduction of import duty on mushrooms which was presented to the Ministry by the Union.

It was suggested at the time that our case was weakened by the fact that imports of mushrooms at that moment totalled 300 tons p.a., against 6,000 tons grown at home, i.e. only 5%.

The general outcome of the Torquay Conference was that Britain was left free to consider Horticulture's case for a revision of tariffs over a wide range of products, including mushrooms. The NFU applied for an increased duty.

In October of this year it was announced in the House of Commons that, in certain circumstances, tariffs on foreign goods could be increased " where we needed to do so to protect United Kingdom industry." The President of the Board of Trade said, in the same context, that he had been " considering an application for higher duties on horticultural products from the National Farmers' Union." Details have been kept closely secret.

There would be a comprehensive review of GATT in the late autumn of 1954.



THE NEXT MUSHROOM INDUSTRY EXHIBITION to be organised by the MGA will be held at **Tunbridge Wells** at the end of **September, 1954.**

RETURNING FROM NATIONAL SERVICE

Part II of the National Service Act, 1948, requires an employer to take back into his employment, if it is reasonable and practicable, any former employees who have been " called up " if they make application to him when their service is at an end. This, in one sentence, summarises the Reinstatement in Civil Employment form R.E.L. 1 (N.S.). MGA members requiring elucidation on any specific aspect of this matter should write to the Secretary for guidance.

CALL-UP DEFERMENT

The Ministry of Labour is tightening up considerably on the question of deferment of young men due for call-up in their age group but employed in the agricultural industry in general. In particular the Ministry is paying attention to cases where deferment was granted but the employee concerned, since that deferment, has changed his place of occupation although his subsequent employment is within the scope of that for which deferment was granted. Hitherto, in such cases, no action has been taken and the deferment allowed to stand.

This position came to the notice of the Ministry last Summer and instructions have now been issued to all Local Officers of the Ministry that this must not continue.

Employees in the position stated may be liable to immediate call-up for National Service and employers of such men are strongly advised to advise the MGA office of any such cases, together with their National Service Registration Number, in order that the National Farmers' Union, who are taking the matter up, may be acquainted with the true position.

MGA members are advised to exhibit this notice without delay.

W.R.A.

NEWCOMERS TO THE EXECUTIVE

W. A. B. Harding

A. G. Pointing

W. A. BASIL HARDING, Governing Director of Tenterden Mushrooms Ltd. in Kent, was born in British Columbia, educated at Bradfield College, Berks., and took a horticultural course at Wye. After several uncongenial office " experiments," he launched out in 1937 into the mysteries of mushroom growing, first in large American-type houses erected by personal labour, then in similar houses which were rented and, after the war, in a third locality where he and his brother Noel have built Tenterden Mushrooms Ltd.'s 20,000 sq. ft. on shelves, one third being on a two-zone system. Married, with two children, he has been a staunch supporter of the MGA and the MRA since their inception. He was a member of the initial MGA Executive and has remained on that Committee except when ill-health necessitated a short withdrawal. Chairman of the first MGA Grading Sub-Committee and one-time member of the Publicity Sub-Committee. Convened the first Area Meeting in Kent, from which developed the extraordinarily successful Kent/Surrey/East Sussex Area Group. With his brother presented the MGA Challenge Cup.

A. G. POINTING was born into Horticulture, his father being a Somerset market gardener who is still actively engaged in the business. Mr. Pointing served throughout the first World War as a pilot in the Royal Flying Corps, seeing active service in France. He served in the second World War as an officer in the Royal Artillery. He is now Managing Director of Cartledge's Nurseries Ltd., of Bramley, Leeds, and also Managing Director of Agaric Ltd., Bradford-on-Avon, Wilts.; the latter Company have been continuously in operation as mushroom growers since 1914.

Norman R. Cooper: Born in May, 1919, at Leicester, he has been interested in mushroom growing since leaving school. Joined the Armed Forces in October, 1939, narrowly escaping premature demise at St. Valery in 1940, with the 51st Highland Division. Commissioned in 1941 and demobilised in 1946, when he began small-scale experiments in mushroom growing. Growing on a commercial scale began in 1950 at Kimcote, near Lutterworth, where he has plant designed especially for the tray system. He is married, with two children, and is a member of the Rotary Club of Lutterworth.

Raymond Thompson: Born 1913. After leaving Harrow School spent several years in France and Germany learning about insurance. Became an Underwriter at Lloyds in 1936 and worked in Lloyds until the war. Served as an Intelligence Officer in the Royal Air Force during the war, and was three times mentioned in despatches. After the war travelled in North and Central America. Started learning mushroom growing in 1947. In 1948 bought a house and land in West Sussex and built his first shelf house. In 1951 converted to the tray system, and now has 25,000 sq. ft. cropping $5\frac{1}{2}$ times per annum. An advocate of the tray system for large growers given suitable layout, grain spawn, steam heat, mechanization and a mass-production mind. Hobbies: sailing, skiing and cooking. Chairman of the new MGA Publicity Sub-Committee.

Captain Giles Tweedie, proprietor of Birch Close Mushrooms, Cardewlees, Carlisle, retired from the Army in 1948. After spending a year on a Dairy Farm decided a 4.30 a.m. Reveille was rather too early, and ever since has concentrated his attention on mushrooms. Grows on shelves and trays, and rather believes shelves to be the better proposition. He adds: "I would like to thank the MGA and the MRA and many others for so much assistance so generously given."

My Favourite Recipes

10.—Jean Conil

Le Caprice d'un Soir

Melt 1 oz. of butter, lard or margarine, in a saucepan and add 1 oz. chopped shallots, 2 oz. diced or finely chopped ham, and 8 oz. small ' button ' mushrooms (the cultivated mushrooms). Toss these ingredients together lightly for 5 minutes, then place in a Pyrex dish and cover with a cheese mixture, which you make with the following ingredients:

2 oz. grated Cheddar cheese
2 oz. broken pieces of Stilton, or blue cheese
2 oz. Camembert cheese
A dash of Worcestershire Sauce
1 tablespoonful of Vermouth
1 oz. butter

Melt these ingredients together in a saucepan and season with a good pinch of Cayenne pepper. When the ingredients are softened into an almost liquid mixture, pour it over your mushrooms in the Pyrex dish and serve at once with toasted Chelsea Buns, either cut in halves, or in fingers.

Cassolette de Champignon au Porto

Boil ¼ pint of Red Port in a saucepan with 1 oz. of shallots, 1 clove of garlic, and 1 pinch of cinnamon for 8 minutes. While this is cooking, wash and thoroughly dry 1 lb. of tiny cultivated mushrooms and gently cook them in 2 oz. of butter for 6 minutes. If they are ' cultured ' mushrooms, do not peel or cut them. Add 2 oz. flour, which you sprinkle over your mushrooms, then gradually add the Port mixture, which will ' thicken.' Finally, add 1 large cupful of fresh cream, season to taste with salt and pepper, then simmer for another 4 minutes, and serve with hot French crescents.

Les Piments Farcis aux Champignons

Split 4 green pimentoes in half and remove the seeds, then brush the outside of the pimento cases with a little oil and place under the grill for 2 minutes in order to skin them more easily. When you have removed the skin, place the cases in a shallow dish and make the following filling:

Ingredients: 1½ oz. butter
2 oz. flour
1 cupful boiling milk
Salt, pepper and nutmeg
2 oz. diced Gruyère
8 oz. sliced mushrooms
3 eggs

Melt the butter, then add the flour and boiling milk, stirring well, and boil for 5 minutes, having seasoned with salt, pepper and nutmeg. Allow to cool, then add the diced Gruyère and diced mushroom, having tossed the mushrooms in butter for 2 minutes beforehand. Mix the ingredients well, then add the yolks of your eggs. Place the egg-whites in a clean basin and whisk to a ' snow,' then fold lightly into the mixture in the saucepan, and fill the empty pimento cases half full. Cover the dish with a ' cloche,' or the bottom half of a transparent Pyrex dish, and bake for 15-20 minutes in a moderately hot oven. When baked, serve with Tomato Sauce blended with 4 oz. chopped mushroom, 1 oz. chopped ham, 1 or 2 chilli peppers, and a pinch of chopped tarragon.

H. H. GLASSCOCK *reviews the* MRA

RESEARCH REPORT FOR 1952

That mushroom growing is a specialised form of crop husbandry will be stressed to any reader of the 1952 report who is familiar with work done at Rothamsted Experimental Station where also synthetic composts, soil chemistry, factorial cropping experiments, pests and diseases are well-known subjects for investigation.

At Yaxley, the production of a satisfactory synthetic compost has not ended the search and work has been continued to see whether the original formulation can be improved or cheapened. In this connexion the Chemistry Department has shown that there are differences in the amounts of Nitrogen retained in composts made from dried blood and urea respectively; a point of importance when assessing the value of spent beds. The report gives useful graphs indicating the nitrogen status of the composts from the first turn until the emptying of the beds.

While a practicable synthetic compost is the most important contribution to date, one is tempted to wonder whether greater revelations may not be forecast for the future. The emphasis of the work in 1952 has been on measurements in relation to that inch or so of soil upon which success and disaster so often depend.

After picking his way between the graphs and tables of Edwards and Flegg, the reader is left with a picture of a living compost with sensitive lungs. In the bed the compost is breathing, heavily at first, then at the end of cropping, with gentle expirations. Should the overlying blanket of soil be suitably porous, there will be no premature death by suffocation nor will the carbon dioxide leak at such a rate that its concentration will be insufficient to stimulate mycelial growth. A wet soil, like a wet blanket, is less porous than when dry.

In order to determine the influence of any particular type of soil on the concentration of carbon dioxide in the compost, it was necessary to find the relations between the rate of diffusion of the gas and pore space, aggregate size and degree of settling in the dry and the wet state. As a result of this work it seems likely that most soils containing little organic matter can now be assessed for their diffusion rates. The optimum concentrations of carbon dioxide required in the compost at different stages of growth is yet to be determined.

In addition to the main lines of research, several cropping experiments were carried out and the results of these will stimulate much thought in the minds of growers. Reference is made to two substances of topical interest, namely vermiculite and soil conditioners containing hydrolysed polyacrylonitrile; the former appears to be toxic to mushroom growth while the latter is damned with faint praise.

The first months with the new disease room were spent in calibrating environment. This was necessary to ensure that conditions were suitable for normal mushroom growth and also that the environment could be adjusted to induce the various disease organisms to thrive.

Few investigations can be less rewarding than those on the chemical control of plant diseases, and mushrooms as patients are no exception. Nevertheless, the list of pathogens on which Miss Gandy has made pilot experiments with therapeutants includes eelworms, Truffle, Red *Geotrichum*, *Mycogone* and *Verticillium*. There are encouraging pointers to control and the way is now paved for more intensive studies.

Report for year 1952 is available for 5/-, post free, from the MRA, Yaxley, Peterborough.

Dr. R. L. EDWARDS *asks:*

Does Synthetic Compost really make Mushroom Growing CHEAP AND EASY?

About seven years ago when I first talked to a meeting of mushroom growers about the results to be expected from research, these two questions were asked, among others.

Did I believe that a commercially satisfactory synthetic compost could be made?

Would such a compost make mushroom growing too easy, so easy that anyone could succeed and mushrooms would no longer be worth growing?

I had no hesitation in answering " Yes " to the first, and " No " to the second.

The fact that *at least* four of the leading growers in the country are now growing entirely on synthetic compost, and two of them have averaged over 2½ lb. per sq. ft. during the past year, confirms my first answer. (I do not know the other growers' figures). Furthermore they can work to schedule knowing that they never need to wait a day for deliveries of manure, and they know exactly what goes into each stack—the same every time.

The second question still crops up at various times and places, although any grower, in fact anyone familiar with the industry who is not a half-wit, can answer it for himself after a little thought.

The usual suggestion is that a cheap synthetic compost would enable anyone to grow mushrooms *cheaply* and *without difficulty*.

Cheaply. Ask any grower, if he were given his manure, or compost materials, free of charge, how much would it take off the cost of a pound of mushrooms?

A ton of manure, costing about £4 delivered, produces 100 to 200 lb. of mushrooms, so the cost of manure is about 4¾d. to 9½d. per lb.—depending on area filled per ton and yield obtained. The cost of the present synthetic compost using dried blood is about the same; using urea it would be less.

So if the synthetic compost materials cost *nothing* it would only reduce the cost of production by 10d. at the outside and for most growers by 5d. or 6d. a lb.

Without difficulty. Would any grower care (or dare) to say that his worries are over when he puts a good compost into a house? That casing soil, watering, ventilation, pests and diseases or even choice of spawn are child's play and can be handled by a novice *without difficulty?* I think not.

Whatever advances may be made to improve this or that material or process, mushroom growing is and will remain one of the most highly skilled branches of horticulture calling for personal judgment and ability of the highest order.

And it is the expert who is best able to use these advances, and who derives most benefit from them. I have spent too much time talking to would-be growers, and pointing out the difficulties to them, to be left in any doubt that most of them do not even begin to know how to use modern developments efficiently.

In a recent B.B.C. Country Questions programme Ralph Wightman dealt soundly and severely with a question suggesting that mushroom growing was a simple matter. I was very pleased to hear this sort of nonsense firmly squashed; any suggestion that mushroom growing on any medium is easy is calculated to make the public think mushrooms should be cheap, and is a serious disservice to the interests of the industry.

CORRESPONDENCE

Quick-frozen vegetables are very much in the news. I have asked three Americans recently whether they were **freezing mushrooms** commercially. One said Yes. Another said they must be cooked first, but research continues. A third told me they have been marketed, but the demand wasn't big enough to justify development.

FRED. C. ATKINS.

I am sure a real blitz on **publicity** is a very real need. I am glad to see at last that a real start has been made on this

Brig. A. S. G. DOUGLAS.

RESEARCH APPEAL, 1953

The Directors of the Mushroom Research Association acknowledge with gratitude the following donations to the 1953 Fund:

	£	s.	d.
Canga Mushrooms Ltd. ..	10	10	0
L. F. Lambert (U.S.A.) ..	10	0	0
E. H. Mount	5	5	0
J. E. Hatfield	5	0	0
E. A. Abbott	4	4	0
L. Knight Ltd.	3	3	0
F. G. Read	2	2	0
S. Cwynar	2	0	0
Bankers' Orders (October)	8	0	0
	50	4	0
B./fd.	1,211	16	3
TOTAL	£1,262	0	3

THE CULTIVATED MUSHROOM

8—CYTOLOGY (*continued*)

By ANDRÉ SARAZIN

2. Vacuolar System or Vacuome

These terms refer to the system which is formed by the aggregate of the cell-vacuoles. The vacuoles occur as aqueous inclusions which are voluminous relative to the cell-body and are composed of hydrophilic colloidal substances. The vacuolar content bears a negative ionic charge which results in their being able to fix basic dyes. Some of these dyes such as neutral red possess the property of being able to penetrate the cytoplasm without causing injury and to accumulate in the vacuole which it colours selectively. These dyes which are called vital dyes, enable one to study the evolution of the vacuoles *in vivo*.

Although they are passive entities and do not form a part of the living substance proper, vacuoles serve an important purpose in the cell. They are centres of accumulation for reserve substances and waste products and serve as a regulatory mechanism for water exchange; firstly, between the cytoplasm and the vacuoles within the cell itself and secondly, between the cell as a whole and the medium surrounding it. This property of the vacuolar colloids, which consists in being able to absorb water as well as to liberate it, plays an essential role in the regulation of the internal osmotic pressure of the cell. One must therefore not lose sight of the fact that the mycelium and the carpophore are merely structures which are made up of an aggregate of minute entities, to wit, the cells, and that their mass rigidity is but the sum total of the individual rigidity of each cell. Thus this rigidity is brought about by the turgidity of the cell and this turgidity is produced by the swelling of the vacuole which causes the cytoplasm to be pressed against the cell-wall. In contradistinction, dessication results in a decrease in the turgidity of each cell and the organism consequently wilts and becomes flaccid.

As it is my wish to confine myself to a succinct account of the vacuolar behaviour of the cultivated mushroom I would refer interested readers for further details to the works on plant cytology which I have already quoted. However, I should mention that the work of Guillermond (1941) and of Bose (1950) enables one to consider vacuoles, and especially those of the fungi, as being reservoirs of enzymes whose anabolic and katabolic activities operate on the fringe of the perivacuolar membrane. In the course of my description I shall frequently and with particular emphasis draw attention to the vacuolar colloids precipitated by the action of vital dyes to form the metachromatic granules. These granules which are characterised by microchemical reactions lead one to suppose that they are derivatives either of ribonucleic acid or of adenotriphosphoric acid.

The study of the vacuolar behaviour of the cells of the cultivated mushroom has been carried out with the aid of a vital dye, namely neutral red in Ringer's solution.

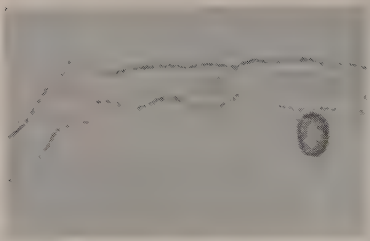


Fig. 1. Photomicrograph x 730. Hypha which has resulted from the germination of a spore. Staining of vacuoles by neutral red.

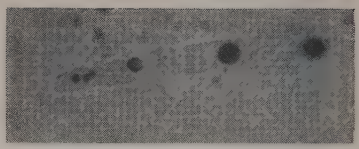


Fig. 2. Photomicrograph x 1,250. Tip of hypha of mycelium. Staining of vacuoles by neutral red.

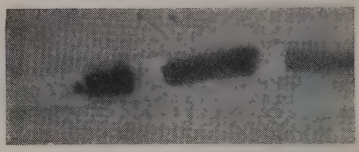


Fig. 3. Photomicrograph x 1,150. Hypha of mycelium. Staining of vacuoles by neutral red.

Mycelium

Once germination of the basidiospore occurs there is little delay in the appearance of vacuoles in the germ vesicle. In very early stages they are at first minute and punctiform but they enlarge rapidly and become rounded while the neutral red causes the precipitation of abundant metachromatic granules. In a germ-tube which has become lengthened into a short mycelium two states of the vacuole may be observed (fig. 1). At the very tip of the hypha or of its actively growing branches vacuoles occur as minute entities in the form of granules, but further back, as they enlarge, they become round or oval, and by fusion, ultimately form at the other end of the cell the central portion which presses the protoplasm against the cell-wall (fig. 2 and 3).

Carpophore

The false tissue of the carpophore is rather uniform as regards the vacuolar behaviour of its cells, each cell possessing generally only two or three large vacuoles which are much less rich in metachromatin than are those of mycelial cells (fig. 4). The only exception to be found is in the growing zone in which a rather large percentage of young cells has only relatively small but numerous vacuoles (fig. 5).

But it is chiefly the special evolution of the vacuoles which commands attention (Sarazin, 1937). As already noted, the hymenium of *Agaricus campestris* becomes organized into gills only at a late developmental stage. At this stage the basidia, in common with all the neighbouring cells have numerous rounded vacuoles which are especially rich in metachromatin; after all they are but the tips of hyphae which have a vacuolar system characteristic of vegetative apices.

In the more fully developed carpophore the basidia become identified by their height which is taller relative to the other structures of the hymenium. In the course of the maturation of the basidium a special development in the behaviour of the vacuoles takes place. The two or three large vacuoles appear to resolve into a very large

number of small vacuoles and this phenomenon continues until the formation of enclosed spores (figs. 6, 7, 8). By the super-positioning of these appearances on those obtained after fixation and nuclear staining in serial sections it may be observed that this vacuolar resolution appears simultaneously with the fusion of the two nuclei of the basidium and continues during the different mitoses which occur before and during the formation of the spores.

It is possible to demonstrate a few minute vacuoles in the young spore but it has not been possible to ascertain if they were drawn into it with the cytoplasm which was expelled through the narrow canal of the sterigma or if they were formed in the spore *de novo*. Once the spores are formed the number of vacuoles decreases progressively and after the expulsion of the spores the basidium ceases all activity and dies. As a result of this the number of vacuoles falls to 2 or 3 and then the cytoplasm becomes disorganized and coagulates. Chadefaud (1937) shortly after my own observations, noted in other agarics the occurrence of similar fragmentation phenomena in the vacuolar system during the maturation of the basidium. He advanced various hypotheses to explain these different states of aqueous equilibrium between the cytoplasm and the vacuome of the basidium which is the centre of nuclear divisions and migrations. The appearance during these states of a refractile and practically milky cytoplasm leads one to suppose that profound modifications of a physicochemical nature takes place in its structure.

Once spores are formed the vacuome again becomes progressively normal, but fragmentation does not actually cease until the discharge of the basidiospores. Now, it has been established that discharge takes place as a result of the secretion of drops of water at the junction of the sterigma and the spore. At this stage the activity of the basidium which is characterised by a fragmented vacuome could be explained by the excretion of water.

The vacuolar behaviour is the most visible manifestation of the vital activity of the cell and curiously enough cytophysiology enables us to suggest an explanation of a phenomenon which is familiar in mushroom culture, namely Bacterial Spot. This term covers disorders with a somewhat varied aetiology but with one feature in common, that is, the brown discolouration of a part of or of the whole epidermal portion of the carpophore. In a chapter on the diseases of cultivated mushroom the primary causes of this disease will be considered in more detail; it is sufficient for the present to consider only the colour-change phenomenon from red to brown which occurs in the carpophore as a result of the water of condensation forming when the beds are difficult to dry off.

It is known that mechanical trauma (such as bruising with the fingers) causes reddening. This phenomenon is due to the release, through the rupture of the cells, of oxidase enzyme and chromogens which normally are colourless in the reduced state (leucoderivatives) in the cytoplasm of the living cell. Oxidase systems cause the fixation of atmospheric oxygen in the chromogens which become oxidised and assume first a reddish then a brownish colour. The pigments

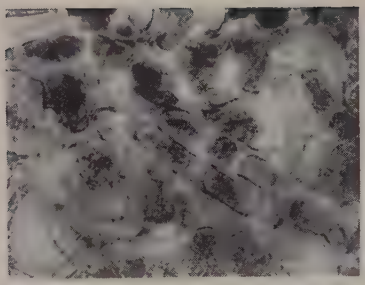


Fig. 4. Photomicrograph x 320. Cells of false tissue of carpophore. Staining of vacuoles by neutral red.

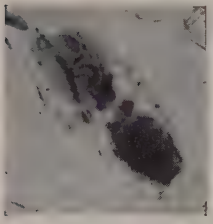


Fig. 5. Photomicrograph x 600. Cells from the growing zone with several vacuoles of different size. Staining of vacuoles by neutral red.

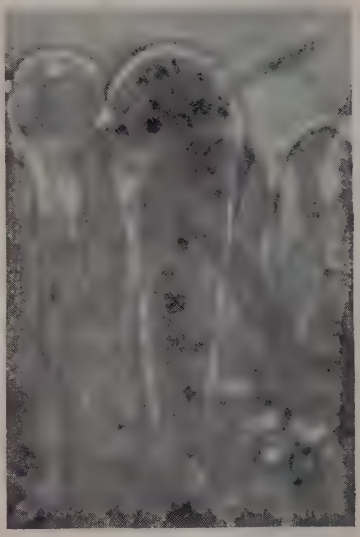


Fig. 6.

Figs. 6, 7, 8. Photomicrographs x 2,200. Staining of the vacuoles by neutral red showing the fragmentation of the vacuoles during the different stages of evolution of the basidium up to the formation of the spores.

diffuse and become absorbed on the walls of dead cells. But in order to be more explicit it should be stated that what is called the epidermis of the carpophore consists of two zones: a superficial zone composed of dead hyphae (simple tubes which have become devoid of all cytoplasmic content) and a deeper zone composed of very active cells which collectively may be termed the subepidermal zone.

In a normal carpophore which is picked off a healthy bed and examined immediately, the vacuoles of the subepidermal zone are small and numerous (fig. 9). This state of the vacuole is consistent with the continuous secretion of water in the form of vapour by the action of the intense and continuous transpiration of the carpophores. But if in contradistinction the cells of this same zone are examined under the same conditions in a carpophore which has remained moist for several hours and has been taken from a bed in which there is a tendency for spot to occur (as a result of insufficient ventilation, excess water, etc.) it may be seen that the vacuolar system will have become simplified and that the vacuole fills almost the entire cell causing extreme distension of the cell-wall under the action of considerable osmotic pressure (fig. 10). These cells are fragile and even become ruptured. Furthermore, this turgescence which is a property of each individual cell, produces, when thus increased, a certain rigidity in the rows of cells which compose the hyphae and consequently spaces are formed in the plectenchyma. This loose structure favours invasion by micro-organisms. The ruptured cells release, on contact with air, oxidase pigment enzymes, and, as already observed, change as a whole to a reddish colour. The pigment which is at first reddish and then brownish, diffuses and becomes absorbed on the walls of the dead cells in the superficial zone of the epidermis and colours it brown. The dead, ruptured cells are the focus of attack by micro-organisms which by multiplication increase the mortality of neighbouring cells; hence the phenomenon of browning.

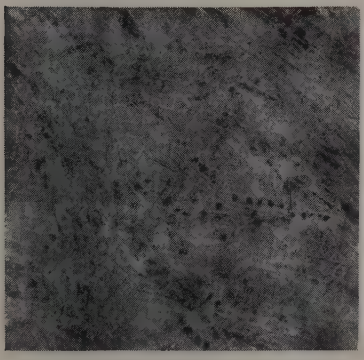


Fig. 9. Photomicrograph x 300. Subepidermal cells with numerous but small vacuoles. Staining of vacuoles by neutral red.

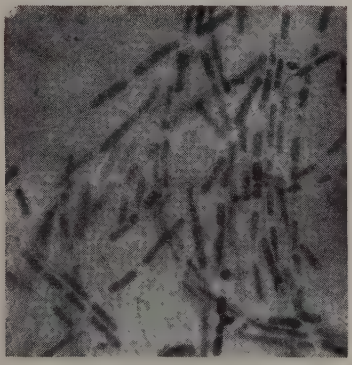


Fig. 10. Photomicrograph x 300. Subepidermal cells with single hypertrophied vacuoles. Staining of vacuoles by neutral red.

If, subsequently, the carpophore becomes drier, the plectenchyma reassumes its normal vacuome and becomes more compact. This increase in compactness results in the imprisonment of nests of micro-organisms thus providing perhaps the explanation as to why small brownish patches occur beneath the surface of the cap without there being any visible communication between them and the exterior.

As a means of counteracting the occasionally disastrous results of wetting on cropping, efforts have been directed towards its control by the use of reducing agents which block the oxidase systems. Nevertheless, while the results are encouraging they are not entirely satisfactory. The study of the behaviour of the vacuolar system in the epidermal zone of the carpophore suggests the possibility of supplementing these measures with saline solution which would be isotonic with the cell-sap and which would forestall the turgescence of cells which would have become too fragile owing to the effects of wetting.

Photomicrographs by the Author, who retains the copyright of this series. The translation is by Dr. C. J. La Touche.

References:

Sarazin, A.—1937. L'évolution du chondriome et du système vacuolaire dans les carpophores et en particulier dans les basides *d'Agaricus campestris*. (The evolution of the chondriome and of the vacuolar system in the carpophores and especially in the basidia of *Agaricus campestris*). *C. R. Acad. Sc., CCIV*, 713.

Guillermond, A.—1941. The cytoplasm of the plant cell. *Chronica Botanica Co. U.S.A.*

Bose, S. R.—1950. On plant vacuoles functioning as a storehouse of various enzymes. *Cellule. Belge.* 53. *No.* 2.

Chadefaud—1937. Le cytoplasme et le vacuome des basides. (The cytoplasm and the vacuome of basidia). *Rev. de Mycologie, Tome* 11 *Fasc.* 3 *and* 4. *ler. juin.*

MY WAY OF GROWING

13—R. Duthy, *of Little Horkesley, Essex*

I have been asked to contribute to the series 'My way of growing.' As I frequently change my methods to keep abreast of the times this article may well be out of date by the time it is written!

I have six growing houses 60 feet by 20 feet built before the war of timber frames giving a four inch air space sandwiched by half-inch thickness of plaster board and asbestos sheets. There are two steaming houses, each half the capacity of one growing room. If I were to start afresh I would reduce the capacity of all by one-third as making a more convenient unit.

The change over to the tray system was made after a visit to U.S.A. The advantages and disadvantages of this system were well ventilated

in a brochure published by the MGA incidentally with illustrations of this plant. I sometimes think that the chief advantage of this system has not been sufficiently emphasized. In most well established farms disease is the constant menace and the longer the cropping period the greater the danger of loss. Any method whereby the time the compost remains in the cropping house can be shortened is desirable, and this is exactly what the tray system does.

My land is riddled with harmful organisms and I always get a nice crop of *Mycogone*, *Verticillium* and *Dactylium* which no amount of concrete can eliminate as they may be airborne. They become prevalent, however, only after the bulk of the crop has been picked. In other words the mushroom is always a jump ahead of the disease. When the house is emptied there is no woodwork left and it can be left as aseptic as a hospital ward and it is much more easily sterilised.

Boxes are made of red cedar, planed, and creosoted. They are 3 ft. long by 2 ft. wide and $5\frac{1}{2}$ ins. deep. Brass screws are used and corner strengthening posts make air circulation better than having the ends of the boxes higher than the length as is usual with the cheaper box. They cost £1 each and last fully ten years. In fact some we have made from old shelves are of wood already fifteen years in commission. My staff are good at handling them and few breakages occur. They are quickly repaired.

Roller conveyors are used from the compost shed to the steaming houses but elsewhere low trolleys are used. Only a firm specialising in time and motion study could establish the cost of handling by the two methods but I doubt whether it would serve much purpose as the main advantage outlined above would outweigh the extra cost of handling —if that indeed were the verdict against the tray system.

Composting by the short term method is practised. I find it saves about 40% of manure or straw. For the practical working of this I am indebted to Doctors Sinden and Hauser. The period of composting varies between 10 and 14 days and the time of steaming depends on the state of the compost.

The machinery used for composting is either a Salopian manure turner in conjunction with a Ferguson fork lift, or a D.L.P. composter, according to the state of the manure.

I am experimenting with MRA synthetic on a fairly large scale and may well change over in view of the fluctuating qualities and prices of stable manure. I know of no grower who seems to have combined the short term composting method with synthetics and I suspect I am rushing in where angels fear to tread.

Grain spawn from Switzerland is used because I find it crops a week earlier than others I have tried. If a method could be devised for mixing the spawn more intimately with the compost I believe the period could be still further reduced. Mice are a nuisance but can be checked if a constant watch is kept.

Disease free casing soil cannot be obtained locally, no doubt because trashings are tipped ten yards from a growing house! The tip is daily disinfected however. I am experimenting with peat, chalk, and cinders, singly or in varying proportions. It does not seem to have affected cropping one way or the other.

Trays leaving the Compost Shed for the Heat Room

Flies during August and September have been prolific and the fears originally felt that a breed of fly immune to DDT and BHC would develop may well be true. There is a new preparation which I am trying which may solve the difficulty but the advent of cold weather has already reduced the infestation.

Heating is by hot water boosted by tubular heaters. There is also a small but highly efficient electric steam boiler used primarily for the steaming houses but it, also, can be used for boosting in the growing houses. Unfortunately owing to the high voltage, 400, it causes the lights locally to fluctuate in intensity which is annoying and interferes with radio and television reception also.

Top ventilation only is used and this seems ample except in very hot weather when an electric fan operates to keep the air in circulation.

It is a curious thing that working parties for most industries have visited the U.S.A. and nearly all have recommended improvements in technique and organisation which could result in higher profits and wages, but few industries have implemented their recommendations. The tray system is analogous except that I provided my own working party.

My own staff is set a target and when it is reached a bonus is paid on the whole production. I hope it will always be paid because the more I pay in bonus the higher the profit and the happier we shall all be.

Tray growers should be deeply grateful to the well-known diarist whose engaging polemics must deter many a grower from adopting the tray system. Its general use would put a lot more mushrooms on the market. From a selfish point of view I wish him well in his campaign!

A Spawned Tray leaving Heat Room and passing the Soil Shed on its way to the Growing Room.

Mm-m-m Mushrooms!

We asked Mac Bulloch for one or two ideas to illustrate his prize-winning Harrogate slogan. Here they are!

McGREGOR BULLOCH, *in more serious vein, reviews*

"MUSHROOMS AND TOADSTOOLS"

Dr. John Ramsbottom, until recently Keeper of Botany at the Natural History Museum at South Kensington, has produced in *Mushrooms and Toadstools* (Collins's New Naturalist Series, 30/-) an exceptionally readable addition to our literature on wild fungi.

It is workmanlike in its layout and the 80 colour photographs by Paul de Laszlo are so delightfully clear that the would-be mycophagist may identify many of the edible fungi with more certainty than is possible with most works of this nature. Particularly comprehensive is the section dealing with the habitat and hosts of all types of wild fungi, so that those who are interested in seeking them should find it a simple matter to plan their forays with reasonable expectation of collecting what they seek. A short list of harmful or unpalatable fungi, in order of effect on the system, would have been a useful addition here.

The section on poisoning by fungi seems very comprehensive and is extremely interesting. It also helps to reassure readers on the point that very few species have fatal results, but there is little likelihood of a switching of the public allegiance from cultivated mushrooms to wild fungi, since it is most difficult to eradicate the general mistrust of anything unusual in that line. It will be news to most people that one variety of the common field mushroom can produce quite unpleasant after-effects.

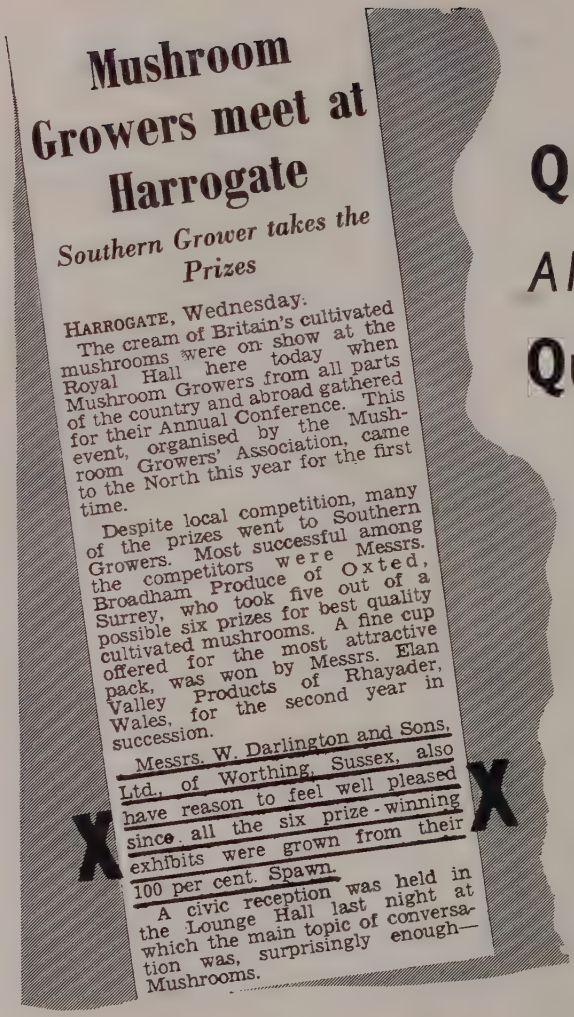
There is a short chapter on growing mushrooms which is sound but obviously not intended to be a guide to mushroom culture. Dr. Ramsbottom states that synthetic composts have not been extensively used in practice. He mentions Dr. Treschow's use of top litter in spruce forests, but makes no reference to the MRA composts, which is surprising in a book whose preface is dated March, 1953.

There is the first mention that I have seen of *Anellaria separata* as an intruder on mushroom beds, but reference elsewhere reveals that it is sometimes placed among the *Panaeolus spp.*, the distinction being the absence of a ring in the latter. It is surprising to read that the author regards all fungi, *including* cultivated mushrooms, as being very indigestible. I have never heard any such complaint from people eating mushrooms, and the general opinion is that the digestion of many other foods is improved by the addition of mushrooms.

This fascinating book should help growers to realize the vast number of media and the wide range of conditions in which fungi grow, and will serve to emphasize that detailed study of the requirements of the cultivated mushroom (not only from the point of view of daily routine but from all aspects) will repay time spent on it.

Incidentally, a footnote records that *Psalliota hortensis* which appeared in a year-old compost heap out-of-doors continued to grow prolifically despite heavy rain and frost. The story suggests that under certain circumstances excessive moisture does no harm.

This book will compel interest where none may have been before.



Mushroom Growers meet at Harrogate

Southern Grower takes the Prizes

HARROGATE, Wednesday.

The cream of Britain's cultivated mushrooms were on show at the Royal Hall here today when Mushroom Growers from all parts of the country and abroad gathered for their Annual Conference. This event, organised by the Mushroom Growers' Association, came to the North this year for the first time.

Despite local competition, many of the prizes went to Southern Growers. Most successful among the competitors were Messrs. Broadham Produce of Oxted, Surrey, who took five out of a possible six prizes for best quality cultivated mushrooms. A fine cup offered for the most attractive pack, was won by Messrs. Elan Valley Products of Rhayader, Wales, for the second year in succession.

Messrs. W. Darlington and Sons, Ltd., of Worthing, Sussex, also have reason to feel well pleased since all the six prize-winning exhibits were grown from their 100 per cent. Spawn.

A civic reception was held in the Lounge Hall last night at which the main topic of conversation was, surprisingly enough—Mushrooms.

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Stanley Middlebrook's Diary

Oct. 16. It is a common experience that small scale, or even large scale, experiments suggest very profitable possibilities. This must be allied to the other accepted theory of " Beginners' luck." This prompts the idea that it might pay us to turn every crop into an experiment and " begin again " each time. In other words, cut out routine and get good crops! Be ignorant and succeed.

Oct. 18. Now that more British spawn makers are supplying grain, one is again in a quandary. Is it the grain or the strain that produces more quickly and that has recently forced some people into grain in preference to manure? We shall see. I'm told that green mould in grain cartons is still one of the problems to be solved.

Oct. 20. My last completed crop was 1·7 and followed an unbroken line of crops over 2 lb. (Average, in fact, 2·4). We were hoping to get 50 in a line—or even never again to get one below 2. But pride must have a fall, so now we've got to start all over again. We don't know the cause of the 1·7 any more than we can explain the 2·4 average. We talk, brag, lay down the law, dogmatize, and so on but we mushroom growers know absolutely nothing really. Will anyone dare to take me up on that?

Oct. 27. Once again, " Chicken and Mushrooms " where the mushrooms were stalks. This time at a well-known hotel on the Great North Road. If these expensive hotels can't afford to buy mushrooms they should not serve stalks and call them mushrooms. I pointed this out to the Head Waiter and hinted that the place for stalks is in the soup pot, not served up on a plate to the public. He was apologetic and would " tell them in the kitchen." What are we to do about it? The public, getting stalks for mushrooms, will take a poor view of our product and stop ordering them either in hotel meals or from the greengrocer. Unfortunately stalks are so many growers' by-product these days. Anything to do with trays? Or grading? Some of you will grade yourselves out of existence soon.

Oct. 28. I can recommend the use of a stapling pistol for fastening the ends of tuck-in covers to the surrounding straps of card baskets. It takes a little longer than the fixing of a rubber band but does ensure a secure covering. The cover cannot be lifted up at the ends by thieving or inquisitive train-waiting passengers.

Oct. 31. At the moment, it seems to me, Mushroom Publicity needs publicity itself. Prices during the past few weeks have risen and everything in the garden is lovely. We don't have to try to sell—we are phoned by the agents, old and new, every day. It happens like this every year and I predict that by the time this is in print your price chart will be falling again and the commission men will have laid down their telephones. The official receivers will be picking up theirs.

Nov. 2. I am frequently asked if peat is better than soil. To which I invariably reply, " If you've got a good soil stick to it." It's so easy to fall into moisture errors with peat.

Nov. 5. A current house is making a good start. 1 lb. in 10 days, 1½ lb. in 13, and 2 lb. in 21 days. Next door, same compost, same type house, same treatment, spawn, casing, etc., has only done 1·4 in the same 21 days. No explanation. Bragging? Not at all. Our first three synthetics are pitiful—only ·4 in first flush and over 3 weeks to get the first lb. Another synthetic has at its second turn reduced its bulk by about 50% for no apparent reason. We know there's nothing stable about stable manure, but there's no synthetic stability about synthetic compost.

Nov. 6. I'm surprised to read in the latest " Mushroom News " that the spawn eating phorid is unusual. We've had this spawn eater many times —particularly badly about 10 years ago. It never eats mushrooms and for a long time we thought it had only an ear-tickling nuisance value. We learned better. We have never, in fact, had mushroom-eating phorids and it has always been our maxim (apparently wrong) that if a fly eats mushrooms it's a sciarid but if it eats spawn it's a phorid.

Nov. 8. If you were wanting to expand what sort of buildings would you erect? Brick, timber and asbestos, foam slag, concrete block, Lignacite, Handcraft, or insulated glasshouse? Indecision on the question leads to inaction. From a purely cultural angle I don't suppose it matters two hoots—we get good crops and bad in any sort of structure — and a decision may ultimately rely on constructional cost. The cheapest —with plenty of air space—may be the best, or as good as any other, for growing mushrooms. But if you take a long view perhaps you would build the most durable house. I wish I knew. If a snap decision were required one could put all the adverts in a hat and draw one out. One might not go far wrong. On the other hand . . . . . ?

Nov. 9. Talking of adverts, here we go. *Dear Mr. Bushell. I've been watching your Bulletin adverts for the past few months and have refrained from comment for fear of appearing ignorant. " Surely," I argued with myself, " there must be something I'm missing; I'm not getting the point; perhaps the penny will drop." The penny hasn't dropped and I can contain myself no longer. You say, " When any grower can buy synthetics at a low price there will be no profit left in mushroom growing." Are you serious, or is it a joke? " Why think of synthetics . . . . . ?" A synthetic, in this context, means a manure raw material, and one can only assume from your advert (a) that synthetics produce better than stable manure or (b) that if we could buy stable manure at a low price there* **would** *still be a profit (because it won't produce as well as synthetics and therefore won't flood the markets?) or (c) that you and your kind are purposely keeping stable prices in the diamond range in order to keep mushroom growers solvent. If (c) we thank you. Is there a fourth inference—that you think synthetics (expensive or cheap) are easier to manage than stable?"* What nonsense!

Nov. 10. Spores, we know, are carried about easily by moving air but this offers no adequate reason for one grower's rather superfluous advice to his disease-spotters, " Don't move about too quickly in case you cause draughts."

SEEN THIS?

M. Fulder & Co. Ltd., of Fenton House, 112-113 Fenchurch Street, E.C.3, are to import the new Swiss **SIROCO Duster.** The complete unit weighs under 3 lb., the strength of the air current produced is claimed to be as great as any other comparable machine five times its size, and an even flow of powder can be maintained over any given area without undue effort on the part of the operator. Rotating brushes can be adjusted to regulate the flow of powder through the machine, thereby giving the operator complete control over the amount he wishes to distribute. The reinforced Vullastite casing is four times stronger and more durable than bakelite and is rust-proof. The price is £4 18s.

ALL CONTROLS on the sale and purchase of **softwoods** have now been lifted.

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Rayner, Commander D. A., Earlstone Manor, Burghclere, Newbury.
Simons, D. E., Arborfield, Wantage Road, Didcot.

BUCKINGHAMSHIRE

Bird, H. G., Long Meadow, South Heath, Gt. Missenden.
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Dudley, Ivor, 78 Oxford Road, Stone, nr. Aylesbury.
Fryer, R. S., Nashleigh House, Chesham.
Johnson, Capt. M. M., Hundridge House, Gt. Missenden.
Kessler, D. F., Bridge Farm, Stoke Hammond, Bletchley.
Mullard, Dr. K. S., Andridge House, Radnage.
Stewart-Wood, J., Aylesbury Mushrooms Ltd., Ford, nr. Aylesbury.

CAMBRIDGESHIRE

Hutchons, J. H., Lynwood, Parson Drove, Wisbech.
Sleight, W., Goat Lane, Gorefield, nr. Wisbech.

CANADA

Baylay, W. F., Campbell Soup Co. Ltd., New Ontario, Ontario.
French, T. M., R.R.3, Milton, Ontario.
Hansen, Preben, 65 Fox Street, Leamington, Ontario.
Leaver, L. H., R.R. No. 1, Port Credit, Ontario.
Reffstrup, Knud, 3230 Laurel Street, North Burnaby, Vancouver, B.C.
Slack, C. Irving, Slack Brothers, Waterloo, Quebec.

CHANNEL ISLANDS

Perrier, D. G., Floriana Augres, Trinity, Jersey.

CHESHIRE

Gamble, Capt. R. A. N., Lea Hall, Lea-by-Backford, nr. Chester.
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Youd, A. H., 8 Guffitts Rake, Meols, Hoylake.

CUMBERLAND

Tweedie, Capt. Giles, Birch Close, Cardewlees, Carlisle.
Wadsworth, R. C., 14 Broadwath, Headsnook, Carlisle.

Co. DURHAM

Thompson, J. R., Stapleton, Darlington.

DENMARK

Grevenkop-Castenskiold, E. W. Store Frederikslund Gods, Frederikslund,
Haase, P. & Son, Lovst Raede 8, Copenhagen K.
Hansen, A., Kastrup.
Hjort, P., Wiibroe's Brewery, Helsingor.
Jacobsen, T., Slangerup.
Jorgensen, P., Osterlund, Ejbyvej, Skovlunde.
Klougart, A., Anker Heegaardsgade 2, Copenhagen V.
Nielsen, Erik, Gladsaxelroj, Branddamsvej, Soberg.
Nielsen, Niels, Gladsaxelroj, Branddamsvej, Soberg.
Olsen, P. Gerh., Sonderskov, Fredericia.
Paludan, Professor H., Helsebakken 15, Hellerup.
Petersen, H., Raunshoj, Bregnerod pr. Birkerod.
Rasmussen, C. R., Skovvejll, Jaarbek, pr. Klampenborg.
Svendsen, K., Fuglsang, Farum.

DERBYSHIRE

Hobday, J. W., Clifton Villa, New Street, Matlock.
Johnson Bros. & Co. (Derby) Ltd., Wholesale Market, Derby.
Riley, M. P., The Summit, 219 Burton Road, Derby.

DEVON

Chapman, G. W., Rushlands, Shaldon, Teignmouth.
Hales, K. L. G., Harringcourt, Pinhoe, Exeter.
Hill, E. N., Kemps Close, Stoke Gabriel, Totnes.
Randall, C. J., The Nursery, Rockbeare, Exeter.
Thomas, R. H., Fairfield Nurseries, Mushroom Farm, Kingsteignton.

DORSET

Douglas, Brigadier A. S. G., Stourpaine House, Blandford.
Dunbar, W., c/o The Bungalow, Pilsdon Manor, nr. Bridport.
Jenks, Norman S., Pilsdon Manor, nr. Bridport.
Maloney, C. E., Gillingham.

EIRE

Allen, R. Ivan, Imokilly Orchards, Shanagarry, Co. Cork.
Carbide Ltd., Collooney, Co. Sligo.
Donnelly, John, Iona Fruit Farm, Oldtown, Co. Dublin.
Flanagan, J. B., 20 Achill Road, Drumcondra, Dublin.
Fletcher, R. H., Kildare Products, Rathangan, Co. Kildare.
Groom, D. I., Irish Nurseries Ltd., Kimmage Road West, Dublin.
Groom, R., Irish Nurseries Ltd., Kimmage Road West, Dublin.
Killian, R. T., Beversion, Mount Annville Road, Dundrum, Co. Dublin.
Meath Packers Ltd., Dunshaughlin, Co. Meath.
Monaghan, J. B., The Park, Mullingar.
O'Brien, D. J., O'Brien's Nurseries, Cloyne, Co. Cork.

ESSEX

Darlington, R. C., Hastingwood, Harlow.
Duthy, R., Greenacre Graded Mushrooms, Little Horkesley.
Gibbons, J. S., Takeley Nurseries Ltd., Takeley.
Harvey, B. H., Principal, Essex Institute of Agriculture, Writtle, Chelmsford.
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Layer Mills Ltd., Layer de la Haye, Colchester.
Littler, W. C., Tylers, North Weald.
Moorhouse, J. H., Jupes Hill, Dedham, Colchester.
Pan Britannica Industries Ltd., Waltham Abbey.
Parsons, Mrs. R., Great Braxted Hall, Witham.
Pinkerton, R. H., Ltd., Lubard's Lodge, Hullbridge Road, Rayleigh.
Sanczwicz, Z., Radwinter Mushroom Farm, Radwinter, Saffron Walden.
Simons, J. E. R., Nans Farm, Harlow.
Simons, R., Mayes Cottage, Tye Green, Netteswell, Harlow.
Smith, W. D., Grange Nurseries, Woodham Road, Battlesbridge.
Speller, R. L., Hoe Lane, Nazeing.
Stevens, W., Thornwood Common, Epping.
Ward, G. C. P., Lime House Nursery, Rayleigh.
White, E. T. W., Wendy, Berechurch Hall Road, Colchester.

FINLAND

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FRANCE

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Chapuis, G., Arbois, (Jura).
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Desnoues, Yves, La Tour de Salvagny, Rhône.
Dezamaulds, B., Bourre, Monrichard, (Loir et Cher).
Guiochon, P., Mesnil-le-Roy, (S. et O.).
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Nail, Abel, Chancay, (Indre et Loire).
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Bramwell, R. Lincoln, 7 Tivoli Road, Cheltenham.
Dumbleton, H., Wessex Nurseries, Lechlade.
Mitchell, F., 7 Evesham Road, Cheltenham.
Newland Products Ltd., The Tunnels, Newland, Coleford.
Richards, G. E. A., The Nurseries, Willsbridge, nr. Bristol.
Rowley, J. D., Kingsheath Nurseries, Cribbs Causeway, nr. Bristol.

HAMPSHIRE

Baring, J. T., Longmead Brickworks, Bishopstoke, Eastleigh.
Batten, E. J., Glendower, Finchdean Road, Rowlands Castle.
Bell, Lt. Col. H. G., Newnham Hill, nr. Basingstoke.
Dring, J. Ltd., The Airport, Portsmouth.
Gay, S. J., 2 Rose Villas, Queens Road, Griggs Green, Liphook.
Hassell, E. T., Branksome House, Waltham Chase, Southampton.
House, Charles, Hill Place, Swanmore, Southampton.
Lance, Richard G., Raggs Corner, Nether Wallop.
Lawrence, Capt. G. P., Barrow Hill, Goodworth Clatford, Andover.
Rooke, Dr. A. R., Beechcroft Nursery, Four Marks.
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Warwick, R. G., Wickham.
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Wills, A. R. Ltd., Tadburn Nurseries, Romsey.

HEREFORDSHIRE

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Venour, Lt. Col. W. A., Hom Lodge, Hom Green, Ross-on-Wye.

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Dean & Speller, Conduit Lane, Hoddesdon.
Driffill, E. J., Tom's Hill House Cottage, Aldbury, Tring.
Gray, L. C. N., Hassobury Gardens, Hazel End, Bishops Stortford.
Hagger, C., The Maples, Melbourn, nr. Royston.
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Knight, J. R., "Dukes", Allen's Green, Sawbridgeworth.
Monro, Geo. Ltd., Technical Dept., Waltham Cross.
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Standard Range & Foundry Co. Ltd., Queens Road, Watford.
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Ward, R. F. H., Ickleford Manor Gardens, Hitchin.
Williams, H. N., Old Rectory, Throcking, nr. Buntingford.

HOLLAND

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ISLE OF MAN

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KENT

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Allnutt, Frere, Palmsted Hill, nr Canterbury.
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Colliet, Air Vice Marshall Sir Conran, Fairbourne Manor, Harrietsham.
Collier, J. C., Fairbourne Manor, Harrietsham.
Flowerhill Nurseries Ltd., Istead Rise, Gravesend
Geddes, R. C., 1 Scotts Lane, Shortlands.
Gock, E. A., Hegdale Cottage, Boundgate, Badlesmere, nr. Faversham.
Griffin, S. D., La Casina, Mount Pleasant, Biggin Hill.
Hall, A., Riversdale, Lyminge.
Harding, Noel D., Temperance Hotel, 52 High Street, Tenterden.
Harding, W. A. B., Stone Lodge Farm, Tenterden
Harrison, W., Coach House, Westwell, nr Ashford
Hayward, W. T., Twisden Cottage, Mill Pond Lane, Tenterden.
Holmes, T. P., Biggin Farm, Challock, Ashford
Jackson, R. L. O., Park Cottage, Doddington, Sittingbourne.
Leach, T. T., Walford House, Smarden.
Martin, A. W., Berrestanger Nurseries, Eastry.
Mason, W. G., Rozel, Harrietsham
Middleton, J., Little Hempsted, Lyminge, Folkestone.
Mount, E. H., Pembroke Lodge, Dover Road, Walmer
Mount, Herbert, Woolton Farm, Bekesbourne, Canterbury.
Roberts, M. G., 121 Abbey Road, Belvedere
Oldfield, J. R., Doddington Place, nr Sittingbourne
Smith, E. N., Plantation House, Rhode Common, Faversham.
Smith, G. C., Loddington Farm Ltd., Linton, Maidstone.
Stedall, G. St. G., Cherry Garden Lane, Folkestone.
Turner, Col. W. A., Pouit House Gardens, Tonbridge.
Vyse, W. J., 7 Cheney Road, Faversham.
Ware, Dr. W. M., Brookfield, Wye, Ashford.
Yelo, J. Cobarro, Fort Darland Mushroom Farm, Gillingham.

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Beardsell, D. R., 6 Castle Street, Formby, Liverpool.
Bleasard, F., Cornwall Place, Blackpool.
Bradley, K. C., Lodge Lane Nurseries, Lytham.
British Basket & Beam Co. Ltd., Irlam, Manchester.
Coates, Fred., Rivelin Nurseries, Course Lane, Newburgh, Wigan.
Collins, Gordon, 23 Queen Street, Liverpool 1.
Conroy, P. J. Ltd., Hope Street, Wigan.
Davey, T. W. Ltd., Smithfield Market, Manchester 4.
Duncan, Miss C., Glaxo Laboratories Ltd., Ulverston.
Faulkner, H., Brent Mead, Firswood Road, Lathom.
Fitzpatrick, P. & T. Ltd., 22 Queen Square, Liverpool 1.
Garner, W. R., Ridgmont Mushrooms, Moss Lane, Hesketh Bank, nr. Preston.
Glaave, D. B., 264 Church Road, Haydock, St. Helens.
Higgins, William, Ivy Cottage, Moss Lane, Lathom, nr. Ormskirk.
Hunt, John, Torr's Farm, Walmer Bridge, nr. Preston.
Kay, Wm. C., Old Brook Hall Farm, Bold, nr. Widnes
Martland, R. G., Burscough Bridge, Ormskirk.
Midwood, R., Cotton Exchange, Liverpool 3.
Mrs. Mulligan's Mushrooms Ltd., 1 Harcourt Road, Blackpool.
Oliverson, N., Kershaws Farm, Smithy Lane, Scarisbrick, nr. Ormskirk.

LANCASHIRE—*contd.*

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Robinson, R. A., 16 College Road, Upholland, Wigan.
Rothwell, J. & Son, Little Hall Farm, Cottage Lane, Ormskirk.
Sanderson, Leonard, 15 Oldfield Carr Lane, Hardhorn, Blackpool.
Tinniswood, R. N., 48 Market Street, Westhoughton.
Vitax Ltd., Burscough Bridge, Ormskirk.

LEICESTERSHIRE

Crowther, Miss E., Lake House, Quorn.

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Atkins, J. H. C., Nuttree Cottage, Ufford, Stamford.
Cutting, James & Son, Water Street, Stamford.
Marshall, S. E., The Mill, Butterwick, Boston.
Wright, C. W., Otter's Lodge, Tallington, Stamford.

LONDON

BIA Ltd., Bia House, Chalton Street, N.W.1.
British Rototherm Co. Ltd., Merton Abbey, S.W.19.
Broome & Green Ltd., Covent Garden Market, W.C.2.
Celcure Ltd., Aldwych House, Aldwych, W.C.2.
Collingridge, J. Ltd., 36 Wellington Street, Covent Garden, W.C.2.
de Lazlo, P. D., 26 Hill Street, W.1.
Doran, Lt. Col. G., United Services Club, 116 Pall Mall, S.W.1.
Elliott, Thomas Ltd., Eagle Mills, 120 New Church Road, S.E.5.
Filmer, F. L., Union Wharf, Wenlock Road, N.1.
Filmer, R. H. Ltd., Union Wharf, Wenlock Road, N.1.
Flower, Major R. A., c/o Lloyds Bank, Cox & King's Branch, Pall Mall, S.W.1.
Gardner, R. W., 20 Hoylake Road, East Acton, W.3.
Gregory L., 2 Westwood Park, S.E.23.
Hedge, C. J., 4 Raymond Buildings, Gray's Inn, W.C.
Hopewell, R., 21 Coronation Court, Hamfrith Road, Stratford, E.15.
Knight, L., Brooklyn, Sewardstone, Chingford, E.4.
Mawby, W. H., 67 Danecroft Road, Herne Hill, S.E.24.
Penny, A. C., 35 King Street, Covent Garden, W.C.2.
Poupart, T. J. Ltd., 110 Long Acre, W.C.2.
Rozanski, K., 8 Coleherne Road, S.W.10.
Sutherland, Major G. A. B., c/o Lloyds Bank, Cox & Kings Branch, 6 Pall Mall, S.W.1.
Wood, G. B., Putney & Coombe Mushroom Farm, 392 Upper Richmond Road, Putney, S.W.15.
Woods, Wm., 3 Botolph Alley, E.C.3.

MADEIRA

Sumares, J. A., Rua do Pina 25, Funchal.

MIDDLESEX

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Mason, Douglas, 18 Eighth Parade, Golf Links Estate, Southall.
Palfrey, E., 32 Manor Park Gardens, Edgware.
Pleasants, H., Woodlands House, 761 Hertford Road, Enfield.
Sanders, S. T., c/o Hartstoke Fruiterers Ltd., Brentford Market, Brentford.
Stevens, P. J., Poplar Farm, Chertsey Road, Feltham.
Williams, J., Brentford Market, Brentford.

NEW ZEALAND

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NORFOLK

Gough, F. & Son Ltd., 40-44 Fishergate, Norwich.
Hannent, S. W., Fifers Nurseries, Spixworth, Norwich.
Read, P. G., South Cottage, Dereham, Wymondham.
Townshend, The Marchioness of, Raynham, Estate Office, Raynham, Fakenham.
Woodsend, Dr. R. C., Valley Farm, Brancaster Staithe, King's Lynn.

NORTHANTS

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Lee, C. C., Pilsgate Manor, Duddle, Peterborough.
Lawrence, F. B., Snowcap Mushrooms Ltd., Werley, Peterborough.
Lawrence, W. C., Snowcap Mushrooms Ltd., Werley, Peterborough.
van Wellinger, P. E., The Stone House, Ravensthorpe.
Wade, B. A., c/o Nipple Mushrooms Ltd., Werley, Peterborough.
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NORTHERN IRELAND

Bates, Geo. & Son Ltd., St. George's Market, Belfast.
Forsythe, W. J. & Son, Ltd., Fairview Nurseries, Budore, Co. Down.
McBrier, R. J., Overdale, Saintfield, Belfast.
McCready, S., Rona, Nurseries, Portadown.
Nelson, R. G., Ballyclare, Antrim, Co. Antrim.
Patterson, Robert, Mossvale Food Production Co. Ltd., Ballygowan, Belfast.
Young, Mrs. M. B., Mountsandel, Coleraine, Co. Londonderry.

NORTHUMBERLAND

Lawrence, G. E., Ltd., 20-22 St. Andrews Street, Newcastle-on-Tyne.
Pearson, S. & Son, 49 Green Market, Newcastle-on-Tyne 1.

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Bentley, A. J., Frearson Farm, New Eastwood, nr. Nottingham.
Cave, A. E., The Houses, East Bridgford.
Cayzer, S., 342 Valley Road, Basford.
Kinwon, S., Old Estate House, Wollaton, Nottingham.
Lightowler, Col. L., Mapperley Mushroom Farm, 7 Mapperley Park Drive, Nottingham.
Smalley, Geo. Ltd., Sneinton Market, Nottingham.
Tweedy, C. W. & Sons Ltd., Wholesale Market, Nottingham.

OXFORDSHIRE

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Fox, F. H. Lane, Middleton House, Middleton Cheney, Banbury.
Mann, Christopher, Hellenwood Estate, Sibford.
Summers, S., M.P., Tremford House, Banbury.

PORTUGAL

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SCOTLAND

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Allan, F., Cedars, Forgandenny, Perthshire.
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Aubrey, R. W., Derwen, Pontfadog, Wrexham, Denbighshire.
Beveridge, John, Bridgend, Kinross.
Burnett, D., West Newgate Mushroom Farm, Arbroath.
Clelland, Wm. Jnr., Crag Cottage, Burnfoot, Kirkmuirhill, Lanark.
Dumbreck, R. D., Mossgiel, Dysart, Fife.
Fraser, R. J., 48 Ashley Road, Aberdeen.
Galbraith, W. S., Albethy, Bridge of Allan, Stirlingshire.
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Leese, General Sir Oliver, Lower Hall, Worfield, Bridgnorth.
Thomas, Major H. Seymour, Oerley Hall, Oswestry.
Watson, Angus, Lower Hall, Worfield, Bridgnorth.
Williams, E. C. F., High-Leyes, By-Pass Road, Church Stretton.
Wilson, J. S., Aqualate Park, Newport.

SOMERSET

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Griffiths, G., Wrington Vale Nurseries, Congresbury.
Iliff, D. D., Higher Parlestone, Holford, Bridgwater.
Pointing, S., Byfield Farm, Combe Down, Bath.
Thirsk, C. E., Wellisford Manor, nr. Wellington.
Wilson, Major D. A., The Steeple, West Camel, Yeovil.
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Dippenaar, Prof. Barend J., University of Pretoria, Pretoria.
Eades, Miss G. Wallace, Noël Terese Nursing Home, Limura, Kenya.
Harris, C. B., Umsintsi Boshkop, P.O. Honeydew, Via Johannesburg.
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Kumst, Cyril, Old Barn, P.O. Roodekop, South Transvaal.
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Robertson, Mrs. H. F. G., P.O. Box 93, Bergvlei, nr. Johannesburg.
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STAFFORDSHIRE

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Brown, P. C., The Birches, The Coppice, Biddulph, Stoke-on-Trent.
Dickinson, Thomas, Wholesale Market, Wolverhampton.
Homer, C. H., 139 Waterfall Lane, Blackheath.
Howse, R. R., Nine Acre Farm, Codsall.
Skidmore, D. A., Moss Close Farm, Buchanan Road, Walsall.
Walsall Mushroom Co. Ltd., Longwood, Walsall.
Wylie, R., Upfields, nr. Tamworth.

SUFFOLK

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Piatkowski, Capt. S., Town Pightle, Dunwich Lane, Peasenhall, Saxmundham.
Vansittart, K. B., Drinkstone House, Drinkstone.

SURREY

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Bushell, D. C. & Co. Ltd., Sandhurst Mills, Camberley.
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Heather Farm Ltd., Horsell Common, Woking, Chobham.
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Jones, A. D., "Hythings", Station Road East, Oxted.
Millais, E. G., Crosswater Farm, Churt.
Mullard Horticultural Engineering Co. Ltd., Englefield Green, Egham.
Nommensen, D. M., Heather Farm, Horsell Common, Woking.
Piette, Dr. D. L., 21 Montague Road, Richmond.
Plant Protection Ltd., Research Station, Fernhurst, nr. Haslemere.
Poulton, J. Ltd., Eastcroft Farm, Windlesham Road, Chobham.
Reed, Guy, Riverdale Mushroom Farm, 29 High Street, Old Woking.
Shackleford Nurseries, Easbing, nr. Godalming.
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Stotter & Mackay Ltd., Norther Lane, Cranleigh.

SUSSEX

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Ball, H. N., The King's Arms, Rotherfield.
Barr, G. P., c/o G. P. Barr & H. J. Barton, Bosworths, Slaugham, nr. Handcross.
Barton, H. F., Winterpick Nurseries, Church Lane, Plummers Plain, Horsham.
Bell, L. G., North Angmering Nursery, Arundel Road, Angmering.
Boxall, H. G., Lansdowne Nurseries, Dappers Lane, Angmering.
Brautigam, V., Ivy Arch Road, Worthing.
Bulloch, McGregor, The Cottage, New Road, Littlehampton.
Chamberlin, W. L., Duncans, Billingshurst.
Church Farm Nurseries Ltd., Rustington.
Coulson, H. L., Lindum Nurseries, Littlehampton Road, Worthing.
Culverwell, E. O. Ltd., Malling Works, Lewes.
Darlington, R. G., Southcourt Road, Worthing.
Darlington, W. & Sons Ltd., Southcourt Road, Worthing.

SUSSEX—*contd.*

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Dowmunt, T. M., Holly Grove, Newick.
Ewart, N. P., Rest Harrow Farm, West Chiltington Common, Pulborough.
Farmers' & Growers' Industries Ltd., British Railway Goods Yard, West Worthing.
Faulkner, M. M., Mill Cottage Market Garden, Horam.
Forsdike, L., Elm Nursery, Elm Drive, Lancing.
Francomb, K. V. S., Meadow Nursery, Oakwood Road, Burgess Hill.
Godfrey, W., 19 Offington Lane, Worthing.
Godsmark, E. B. & Son, Grinstead Nursery, Grinstead Lane, Lancing.
Godson & Mallard Ltd., Stirling Chambers, Chapel Road, Worthing.
Grant, G. F. B., Church House, Washington, Pulborough.
Greenyer, C. T., Broadwater Green Nurseries, Worthing.
Harris, J., Dappers Lane, Angmering.
Hartley, N., 85 Wembley Avenue, Lancing.
Hopkins, R. J., Hammer Lane Farm, Vines Cross, Horam.
Hunt, R. H. J., Rotherlea, Easebourne, Midhurst.
Jupp, J. S., Bridge Nurseries, Coldwaltham, Pulborough.
Keens, W. F., Meadway Mushroom Farm, Littlehampton Road, Durrington, Worthing.
Kessler, J. L., Dingley Nurseries, Rustington.
Kimmins, H. A., 5 Garrick Road, Worthing.
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Knight, W., Arendee, Langney, Eastbourne.
Langford Nursery, Clyming, Littlehampton.
Leeney, A. G., Worthing Vineries Ltd., 234 Dominion Road, Worthing.
Leverington, P. G., 20 Palmeira Avenue, Hove.
Linfield, A. G., Chesswood Nurseries, Thakeham.
Lisher, G. A., Brierley, Grinstead Lane, Lancing.
Lisher, H., The Finches Nursery, Elm Grove, Lancing.
Lower North Barn Nurseries Ltd., Old Salts Farm Road, Lancing.
Paget, C., Half Moon Nurseries, Roundstone Lane, East Preston, Littlehampton.
Passmore, J. J., Anchorage, Worthing Road, Rustington.
Rice, George, "Thirlmere", Littlehampton Road, Goring-by-Sea.
Sampson, S. A. F., Rushmans Nursery, Oving, nr. Chichester.
Sandford, Capt. A., Searles Gardens, Fletching.
Sparkes, A. G., Smugglers Farm Ltd., West End Nurseries, Roundstone Lane, East Preston, nr. Littlehampton.
Sparkes, E. M., Abbey Nurseries, Sompting, Worthing.
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Ulm, J., Cupressus Nurseries, Washington, Pulborough.
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Sjostedt, Sven, P. Hakanssons Konserver A/B, Eslov.
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Swedish Institute For Food, Preservation Research, Kalleback, Goteborg.
Wendler, Bo T., P.B. 15, Halmstadt.
Westin, Gunnar, Daltorpsgatan 49b, Goteborg.
Wiberg, Anders, Ovra Fogelbergsgatan 3, Goteborg.

SWITZERLAND

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Hadorn, E., Champignon-Zentrale, Zurich.
Kuhn & Co., Champignon-Kulturen, St. Gallen.
Parmentier, J., 70 Route des Acacias, Geneve.
Sinden, Dr. James W., Gotthard, Gossau-Zurich.

UNITED STATES OF AMERICA

Blank, Bernard B., Michigan Mushroom Co., Niles, Michigan.
Blum, Dave, Loews International Corporation, 1540, Broadway, New York.
Brandywine Mushroom Corporation, West Chester, Pennsylvania.
Colodny, R. G., P.O. Box 447, Soquel, California.
Dyke, R. A., Michigan Mushroom Co., Niles, Michigan.
Fred, Corwin, Lebanon. Ohio.
Fry, Norman, Walnut Hill Mushrooms Inc., Bettsville, Ohio.
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Green, W. Howard, c/o Concord Foods Inc., Concordville, Pennsylvania.
Holston, Earl M., Grocery Store Products Co. Inc., Union & Adams Streets, West Chester, Pennsylvania.
Knaust, Henry, West Camp, New York.
Knaust, Henry Jnr., Knaust Mushrooms Inc., Vallmeyer, Illinois.
Kneebone, Dr. Leon R., Director of Mushroom Research, Pennsylvania State College, Pennsylvania.
Lambert, Dr. Edmund B., Senior Mycologist, Plant Industry Station, Beltsville, Maryland.
Lambert, L. F., Coatesville, Pennsylvania.
Leo, John C., Box 96, Toughkenamon, Pennsylvania.
Leo, Vincent A., 241 North Union Street, Kennett Square, Pennsylvania.
Leslie, Neale, 629, "C" Street, Petaluma, California.
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de Wire, Paul, Kennett Square, Chester County, Pennsylvania.
Yoder, John B., Butler Co. Mushroom Farm, West Winfield, Pennsylvania.

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